Corrosion Repairs Using The Radial Bristle Disc

By Thomas Doughty

High speed drill, mandrel, and radial bristle discs.

Abrasive wheel, radial disc,and flap brush.

The Sailors in VAQ-131 have tested the discs.

Editor's note: We ran a story on the testing and evaluation of radial bristle discs in the fall 2001 issue. Here's an update.

Abrasive wheels and flap brushes long have been used to remove small amounts of corrosion and paint from aluminum surfaces. However, these tools also can abrade the metal.

The Naval Air Systems Command has authorized using the 3-inch radial bristle disc for removing small spots of corrosion from aluminum surfaces. It was viewed as a replacement for the flap brush and abrasive wheel. Approval for use on high-strength steel and titanium surfaces is pending until a formal IRAC is issued. The Lancers of VAQ-131 used the radial bristle discs during their 2002-2003 deployment to the Persian Gulf aboard USS *Constellation* (CV-64). AM3 Josh Lawson of VAQ-131's WC-12C said, "I did not like them at first, but then realized that I was trying to remove too much material. With some training and practice, I am now able to remove the corrosion very quickly with pinpoint accuracy. Using these discs, the Alodine Touch`N Prep pen, and paint pens (called SemPens) allow us to get the job done in a hurry when we have to."

Two types of discs have been approved for fleet use. An orange disc with a grit equivalency of 400 has been designed for use on light surface-corrosion discrepancies (such as filiform). This disc also is ideal for edge feathering. A yellow disc with a grit equivalency of 360 is meant for heavier corrosion and light-to-moderate surface pitting. The yellow disc also can remove light amounts of sealant around access panels and similar structures. The working area of the disc is 0.75 inches. It stops working when the bristle fingers are worn down to the disc hub. At this point, you have to get a fresh disc.

The bristle disc has five key advantages:

- Saves time. You can get the job done in about half the time because the uniform concentration of abrasive minerals provides a high cut rate for a faster, more uniform finish.
- Protects the metal. Bristle discs will not abrade bare metal like the flap brushes can. The flexible bristles of the discs conform to the contours of the part, which reduces the amount of damage done and the rework required.
- Reduces surface temperature. The bristle disc produces a surface temperature of about 100 degrees Fahrenheit, while the abrasive wheels yield temperatures around 200 degrees F.
- Smaller treatment area. The bristle discs are more precise and do not remove excess paint.
- Easier to use. The bristle disc requires 1.5 pounds of pressure to be applied (via the grinder) in order to remove corrosion. Abrasive wheels require 12 pounds of pressure to accomplish the same task.

Bristle discs are not meant to be used inside fuel tanks, or on magnesium or composite surfaces.

AM3 Jason Clark, a member of the Lancers corrosion-control team, stated, "The biggest advantage of the bristle disc is the ability to remove small spots

of corrosion with less effect on the area around it. We have had good results feathering the paint with the orange disc. The use of these discs cuts the prep time in half as you are dealing with an area of bare metal smaller than a dime. The bristle disc also removes more of the corrosion from around screws and rivets—corrosion that a flap brush would leave. This fact results in fewer repeat discrepancies." AM3 Joy Timpog said, "The discs really helped out when working discrepancies found in the flap wells and under the slats. The time allotted for a wing spread on the ship is minimal, and we really have to hustle. What used to take us four to five hours with a flap brush is now one-and-a-half to two hours."

AMCS Jay Shannon, the QA senior chief, is an advocate of bristle discs and has been instrumental in its evaluation. He tested the discs at VAQ-129, when assigned to COMVAQWING. They used the discs to prep the landing-gear area, around the center-section wing in the wheelwell area, to comply with AFB 548. The job took only two hours, or about half the time of a flap brush.

The bristle disc requires an air source of 90 to 110 pounds per square inch, a high-speed pneumatic die grinder rated from 22,000 to 25,000 rpm (not the 3,200 rpm with most available grinders), and a mandrel assembly. You have to operate the grinder at its maximum rated speed, but you only need to apply a small amount of pressure to strip a surface. If you apply too much pressure, the bristles will fold, and the tool won't work. You'll avoid the "valleys" that form with flap brushes and abrasive wheels.

Safety and health are big concerns. The radial bristle disc generates dust particles that may contain chromates from primers, so you must wear eye and respiratory protection when using the tool.

You will need a little training on using the discs. Naval Air Technical Data and Engineering Service Command (NATEC) martial technologist (MT) representatives at most Navy and Marine Corps activities provide hands-on training for this, too, as well as all other corrosion-related materials and processes.

No other commercial off-the-shelf bristle discs meet NAVAIR's specifications. Although many types of discs are available on the open market, the only authorized discs are manufactured by the 3M Corporation: Orange discs (for light surface corro-

The Naval Safety Center is dedicated to reducing mishaps by 50 percent in two years.

Flight, Flight-Related, and Ground Class A Mishaps 03/17/2004 to 05/31/2004

Aircraft	Command	Date	Fatalities
FA-18C	VFA-82	03/24/2004	0
Aircraft struck water. Pilot ejected and was rescued.			
FA-18C	VFA-15	03/26/2004	0
Aircraft crashed on takeoff roll. Pilot ejected safely—minor injury.			
FA-18A	VFA-203	03/29/2004	0
Pilot ejected during low-level flight. Hornet struck ground and was destroyed.			
F-14D	VF-31	03/29/2004	0
Tomcat diverted to NAS with fuel-transfer problems. Crew ejected safely. Aircraft was lost at sea.			
AH-1W	COMMARFORPAC	03/30/2004	0
AH-1W	HMLA-775	03/30/2004	
Two Cobras collided at a forward arming-refueling point (FARP). Minor injuries.			
FA-18A	VMFA-112	04/21/2004	1
Hornet's pilot ceased audio transmissions during flight and failed to return to base.			
CH-46E	HMM-266	04/26/2004	0
Hard landing during brownout. Rotor blades struck terrain, but helo remained upright.			
FA-18C	VFA-82	05/28/2004	0
During a PMCF, the FLIR pod separated from the Hornet and fell into the sea.			

Class B Mishaps 03/17/2004 to 05/31/2004

Aircraft	Command	Date
FA-18E	VFA-115	03/23/2004
No. 2 elevator was lowered and folded wings struck the ship.		
C-2A	NAS NORTH ISLAND	03/27/2004
Aircraft was taxied for respot. It lost brakes and steering, striking an oil truck.		
MH-53E	HC-4	03/29/2004
Bad weather damaged two aircraft on a ship.		
F-5E	VFC-13	03/31/2004
Aircraft on post-maintenance test flight ran off runway during roll out. No injuries.		
EA-6B	VAQ-137	04/01/2004
Bird struck Prowler on a low-level training flight and was ingested down the port engine.		
FA-18A	VMFA-142	04/05/2004
Starboard leading-edge flap departed the aircraft during maneuvering flight.		
UH-1N	HMLA-167	04/20/2004
Helo had a single-engine failure in flight, resulting in a hard landing.		
P-3C	VP-9	04/28/2004
Hard landing after an abort for an unsafe gear up and flap asymmetry problem.		
T-45C	VT-9	05/09/2004
Nose strut assembly damaged from arresting gear.		
T-6A	COMTRAWING-6	05/18/2004
Propeller struck a chock during taxi.		
S-3B	VS-31	05/29/2004
Aerial-refueling store inadvertently jettisoned.		